

Original Research Article

Assessment of national vector borne disease control programme in state of Karnataka

Puneet Kumar Arali^{1*}, Deepthi N. Shanbhag²

¹Rajiv Gandhi Institute of Public Health and Centre for Disease Control, RGUHS, Bangalore, Karnataka, India

²St John's Medical College and Hospital, Bangalore, Karnataka, India

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*Correspondence:

Dr. Puneet Kumar Arali,

E-mail: drpunittarali@gmail.com

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ABSTRACT

Background: National vector borne disease control programme (NVBDCP) was launched to control the prevalence of vector borne diseases like malaria, filaria, Japanese encephalitis (JE), Dengue/DHF, chikungunya, lymphatic filariasis and Kala Azar. The present study was done to assess the activities of NVBDCP in state of Karnataka and to analyze selective qualitative and quantitative indicators related to the activities.

Methods: Quantitatively retrospective data was collected from Directorate office Department of Health and Family Welfare, NVBDCP section from April 2016 to March 2017. Qualitatively questionnaire based protocol was made and interviews were conducted with District programme officer, PHC medical officer and grass root level health workers like ANM, ASHA with reference to one each of selected least performing districts and good performing districts in the state. The collected data was analysed by using Microsoft Excel 2010 version.

Results: The highest prevalent districts in Karnataka are Dakshina Kannada for malaria, Udupi for dengue, Tumakuru for chikungunya and Bidar for lymphatic filariasis. Major factors related to poor outcome in some districts were rigid attitude of the community, poor support of local panchayats and less human resources.

Conclusions: The result of this investigation revealed that Dakshina Kannada has got highest number of cases with greater proposition and high prevalence rate of vector borne diseases due to lack of sufficient human resources and geographical factors. Strengthening the surveillance activities along with integrated vector control programmes will improve the outcome of the programme.

Keywords: Vector borne diseases, Karnataka, NVBDCP

INTRODUCTION

The National Vector Borne Disease Control Programme (NVBDCP) is an aegis which includes the programmes for prevention and control of vector borne diseases viz., malaria, filaria, Japanese encephalitis (JE), Dengue/DHF, chikungunya, lymphatic filariasis and Kala Azar. The programme is executed as per the National Policy of Government of India, Directorate of NVBDCP, Delhi. Since December 2003, it is being implemented in Karnataka.¹

The NVBDCP was originated from centrally executed programmes like National Malaria Control Programme (NMCP) launched in 1953 for malaria control in high endemic areas; National Malaria Eradication Programme (NMEP) in 1958 started in view of spectacular success of NMCP; Modified Plan of Operation (MPO) in 1977 with the immediate objectives to prevent deaths and to reduce morbidity due to malaria; Malaria Action Programme (MAP) in 1995 based on the recommendations of the Expert Committee; Enhanced Malaria Control Project (EMCP) which was initiated to tackle malaria problem

in high risk areas other than North-Eastern (NE) states and National Anti-Malaria Programme (NAMP) in the year 1998 to reduce the overall incidence of malaria in the Nation. The prevention and control of other vector borne diseases namely lymphatic filariasis, kala-azar, was also being dealt by the Directorate of NAMP in addition to need based support for Japanese encephalitis and dengue.²

Karnataka state with the vast semi-urban areas, rich irrigated lands and good monsoon, facilitates prolific growth of mosquitoes and transmission of malaria.³ The total population of Karnataka as per NVBDCP is around 5,78,00,000 in 2016-17. The state is divided into 30 administrative districts, 176 taluks and there are 40,323 villages/urban agglomerations with earmarked boundaries (Figure 1).

The state of Karnataka is committed to elimination of malaria by 2022 in the line with national goal of elimination the state framework for elimination of malaria has been drawn up this has been possible because of organised malaria prevention and control activity.

Vector borne disease is an important public health problem in India. They account for more than 17% of all infectious diseases causing about 7 lakhs deaths annually.⁴ There are no published studies done on overall evaluation of NVBDCP in state of Karnataka. However there are some studies done individually for malaria, dengue, chikungunya, JE, Kala-azar and lymphatic filariasis for assessing the programme progress, current statistical data and disease burden in different districts.

Hence the present study was done with the objectives to evaluate the activities of NVBDCP in state of Karnataka and to enumerate and critically analyze selective qualitative and quantitative indicators.



Figure 1: Map of district visited.

METHODS

The present cross sectional study was conducted after getting approval from Institution ethics committee, Rajiv Gandhi Institute of Public Health and Centre for Disease Control at Bangalore in different districts of Karnataka for a period of 6 months.

Quantitatively retrospective data was collected from Directorate office Department of Health and Family Welfare, NVBDCP section from 1st April 2016 to 31st March 2017. Data analysis was done for individual diseases in particular with district. Indicators were assessed under inputs, processes, outputs, outcomes and impacts as recommended by NVBDCP.

Qualitatively, content analysis with reference to burden of diseases in the districts of Bangalore rural, Bangalore urban, Dakshina Kannada, Bidar and Kolar was done after going through the secondary analysis of data. Following this, several in-depth interviews/key informant interviews were conducted with District programme officer, PHC Medical Officer and grass root level health workers like ANM, ASHA with reference to one each of selected least performing districts and good performing districts in the state. The standard check list for monitoring and evaluation under the NVBDCP will be used to assess the ongoing programme of the same selected least and good performing district.

Statistical analysis

The collected data was analysed by using Microsoft Excel 2010 version. Descriptive statistics like frequency, mean will be used to analyze the data. From the analysis the best and worst performing were identified. Additionally the interview guide was focused mainly to understand main reason for the program success and failure.

RESULTS

Quantitative analyses

As given in Table 1 total number of malaria cases in the 2016-17 reported was 9655 cases with the prevalence rate of 1.67, case fatality rate (CRF) and death rates were zero. Among the various districts, Dakshina Kannada stands with 5766 malaria cases with proportion of 59.7%, prevalence of 115.69, zero deaths and zero CFR. Number of dengue cases was 6,105 during the period 2016-17, with the prevalence rate of 10.55% and CRF is 0.13%. Among the various districts Dakshina Kannada stand with 474 dengue cases with proportion of 7.8%, prevalence of 95.10% and 0% CFR. Total number of Chikungunya cases reported in the 2016-17 was 1471 cases. Zero deaths with the prevalence rate of 2.54 and CRF is Zero. Among the various districts Tumakuru stands with 207 cases with proportion of 14.1%,

prevalence of 7.31, zero deaths and zero CFR. As per the records of 2016-17, total number of Japanese encephalitis (JE) and acute encephalitis syndrome (AES) cases in the 2016-17 was 746 AES and 22 JE cases. Zero deaths with the prevalence rate of 0.04 and CRF is Zero. Among the various districts Dakshina Kannada stands with 98 AES cases and 5 JE cases with prevalence rate of 1.00, zero deaths and zero CFR.

Table 1: Prevalence of vector borne disease in Karnataka state between April 2016 to March 2017.

Disease	Cases	Prevalence*	CFR
Malaria	9655	1.67	0
Dengue	1471	2.54	0
JE and AES	746.00 and 22.00	0.04	0

*No of cases per 100000 population, CFR=case fatality rate, Total population=57865468, no of districts=30.

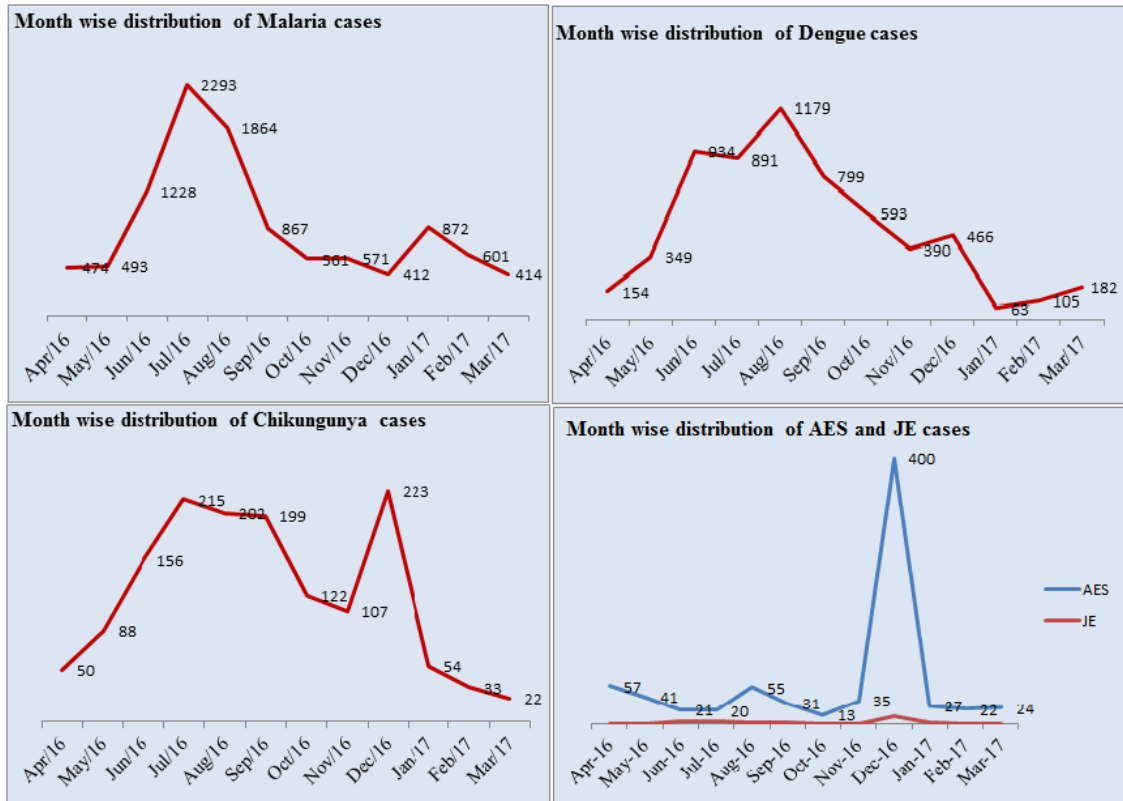


Figure 2: Month wise distribution of vector borne disease in Karnataka State between April 2016 to March 2017.

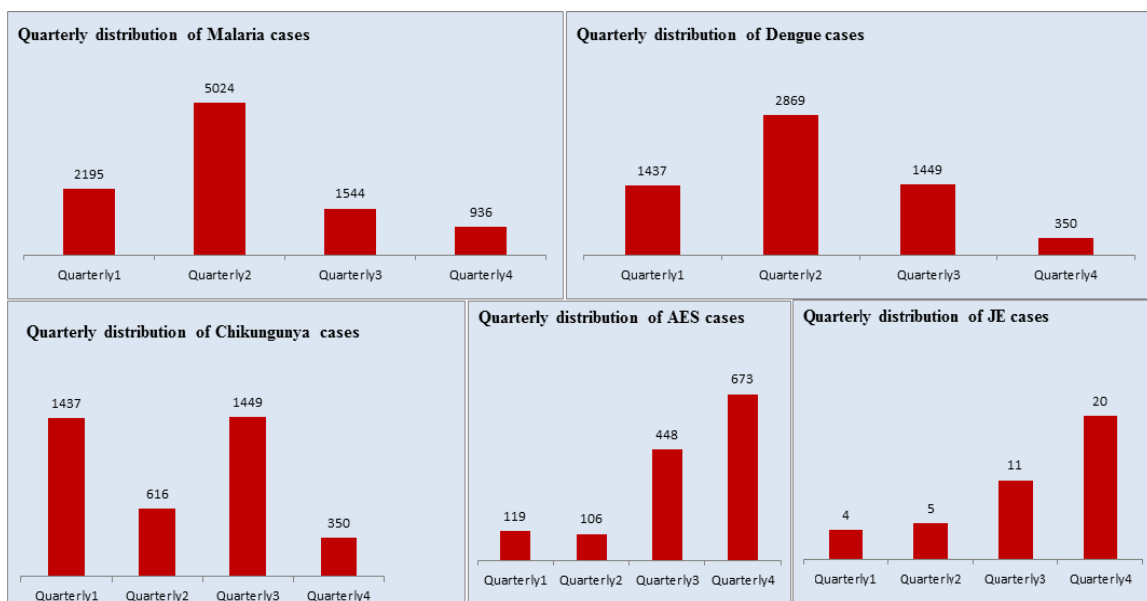


Figure 3: Quarterly distribution of vector borne disease in Karnataka state between April 2016 to March 2017.

Table 2: Distribution of blood sample collected, examined, positive case, slide examination rate and slide positivity rate for vector borne disease in Karnataka state between April 2016 to March 2017.

Disease	Blood sample collected	Blood sample examined	Positive cases	Slide examination rate	Slide positivity rate
Malaria	9392515	9392515	9002	100	0.958
Dengue	34084	17130	3453	50.3	20.2
Chikungunya	13482	7591	1315	56.30	17.32

Table 3: Population and cases for the vector borne disease in districts of Karnataka state between April 2016 to March 2017.

District	Malaria		DEN/CHIK		
	Population	Total cases	Population	Suspected cases	Total cases
Bangaluru (U)	5158744.00	13.00	5158744	13608	372
Bangaluru (R)	1053963.00	13.00	1053963	13	28
Ramanagar	1163419.00	8.00	1163419	270	92
Kolar	1663022.00	11.00	1663022	153	155
Chikkaballapura	1240438.00	3.00	1240438	215	106
Tumakuru	2833214.00	54.00	2833214	957	439
Chitradurga	1605412.00	17.00	1605412	612	473
Davanagere	2144951.00	23.00	2144951	1198	497
Shivamogga	1815486.00	70.00	1815486	333	555
Belagavi	5093322.00	42.00	5093322	489	169
Vijayapura	2399175.00	88.00	2399175	380	385
Bagalkote	2015581.00	277.00	2015581	418	195
Dharwada	2003612.00	79.00	2003612	1016	134
Gadag	1121341.00	175.00	1121341	183	119
Haveri	1716258.00	150.00	1716258	171	318
Uttarakannada	1340587.00	64.00	1340587	108	60
Kalaburagi	2801232.00	611.00	2801232	160	303
Yadagiri	1289380.00	160.00	1289380	103	42
Bidar	1806435.00	72.00	1806435	55	66
Ballari	2535913.00	61.00	2535913	2685	380
Raichur	2094064.00	94.00	2094064	229	93
Koppal	1477863.00	349.00	1477863	231	122
Mysuru	3221312.00	41.00	3221312	3983	710
Chamarajanagar	1035756.00	31.00	1035756	645	242
Mandya	1871832.00	78.00	1871832	483	276
Hassan	1789407.00	19.00	1789407	806	366
Dakshina Kannada	498405.00	5766.00	498405	632	423
Udupi	1294649.00	1028.00	1294649	3428	808
Chikkamagaluru	1175084.00	31.00	1175084	277	271
Kodagu	509260.00	16.00	509260	243	57

Figure 2 presents the month wise distribution of vector borne diseases during the period from April 2016 to March 2017. As per Figure 2, the prevalence of malaria and dengue was more during monsoon i.e., from the period May to October. The prevalence of chikungunya reached to the peak level in the month of December and declined by March. Incidence of JE and AES cases shoot up to 400 cases in the month of December and by January it was drastically reduced to 27 and later was stagnant.

Similar to the month wise distribution, quarterly distribution of vector borne diseases which corresponds to the seasons in Karnataka state 2016-17 was presented in Figure 3. Quarterly distribution of malaria and dengue cases showed that second quarter has got highest cases i.e., 5024 and 2869 respectively and the quarter four has got least number 936 and 350 respectively. Prevalence of chikungunya and has got highest number of cases in the first and third quarter i.e. 1437 and 1449 respectively. Frequency of JE and AES was higher during third (448 and 11) and fourth quarter (673 and 20) respectively.

Table 4: Population and cases affected with lymphatic filariasis in districts of Karnataka state between April 2016 to March 2017.

District	Population	Cases
Belagavi	5093322	0
Vijayapura	2399175	355
Bagalkote	2015581	644
Uttara Kannada	1340587	0
Kalaburagi	2801232	0
Yadagiri	1289380	2101
Bidar	1806435	3264
Ballari	2535913	0
Raichur	2094064	0
Koppal	1477863	0
Dakshina Kannada	498405	0
Udupi	1294649	0

As per NVBDCP guideline, blood samples were collected, to screen for vector borne diseases annually. As presented in Table 2, blood samples were collected from 93,92,515 cases to examine the presence of malarial parasite. Of them 9002 cases were positive with slide examination rate by 100% and slide positivity rate by 0.95%. Among all the districts of Karnataka, large number of blood samples was collected from Dakshina Kannada (36585). Of them positive case 5502 cases were positive for malarial parasite with slide examination rate of 100% and slide positivity rate of 15.04%. About 34084 blood samples were suspected for dengue and blood samples were collected from 17130. Of them, 3453 cases showed positivity for dengue with slide examination rate of 50.3% and slide positivity rate was 93.3%. In Shivamogga, positive cases of dengue were noted in 251 cases, with slide examination rate of 80.8% and slide positivity rate of 93.3%. Chikungunya was suspected in 13482 cases and blood samples were collected from 7591 cases total positive cases reported 1315 with sample collection rate of 56.30% and positivity rate of 17.32%. The district Shivamogga records 53 suspected cases, 53 samples collected, positive cases 53 indicating 100% sample collection rate and positivity rate.

Table 3 and 4 shows population and cases affected by the vector borne disease in Karnataka state. Large number of malaria cases (5766) was noted for Dakshina Kannada, dengue/ chikungunya cases (3428) was highly noticed for Udupi district. Prevalence of lymphatic filariasis cases (3264) was higher in Bidar district.

Table 5 shows the prevalence rate of malaria and percentage of vacant and untrained personnel allocated for each district. Among all the districts, Shimoga had prevalence rate of 115.69 of malaria and 35.9% of medical officers posts are vacant. Of them, 83.9% were untrained health personnel whereas for D. Kannada district the prevalence rate of malaria was 115.69 and 27.5% of Jr. lab technician posts were vacant and 39.7% of them were untrained health personnel. Sr. health assistant post were 83.3% vacant and 42.9% were

untrained. Likewise Jr health assistant post were 14.7% vacant and 28.0% were untrained. 24.5% of ASHA worker post was vacant and 47.1% are untrained in vector borne disease control program. As per the statistics of the annual year Asst Entomologist posts vacant are vacant (100%) in Bangalore urban, Bidar, Chikkamagaluru, Chamarajanagar, Yadgir, Koppal. Posts were not at all sanctioned for areas of Chikaballapur and Ramanagar.

Qualitative data

The qualitative data was obtained from the respondent after taking their consent for the in-depth interview. The respondent were medical officer in-charge of the NVBDCP and also medical officer handling PHC were also included other staff like lab technicians, staff nurses, ANMs and the ASHA workers from good and worst performing districts to better understand the causes, factors responsible for the status of the NVBDCP.

Bangalore rural

The staff of PHC and ASHA workers replied that the output of NVBDCP was very good. The factors for the better outcome listed are as follows “firstly good and competent human resource, regularly conducting IEC and re-orientation training program, attending to the training programmes of NVBDCP regularly, active community participation, sustained and strong support local panchayat’s and implementing innovative ideas like posters, drawing competition for school children regularly”.

Dakshina Kannada

As per the staff of the district the result of NVBDCP was poor. Medical officer replied “that one of the reasons for the high burden of diseases is the weather of the coastal region and the geography of the region, the next reason is proper reporting”. Staff nurse of the area reported that the outcome was poor due to “insufficient staff, burden of work, lack of leadership and rigid attitude of the community”. Positive response was given by ASHA workers and NVBDCP officer regarding implementation of IEC activities. They replied that “they were regularly visiting to houses and giving awareness about the vector borne disease and its complication, maintaining the register and promptly reporting regularly to the concerned authorities. Any case reported will be taken serious and immediately medical officer will be communicated and the concerned program officer will rush to the field and they are having good and supportive staff. But the poor outcome was due to rigid community behaviour”.

Bidar

The staff of PHC and other related health workers regarding the implementation NVBDCP for control of lymphatic filariasis replied that “we have got competent supportive staff, and we are conducting regular IEC

activities in village, also home to home visit to create awareness of disease risk, we use innovative ideas for health education like TV shows, jatara etc. There is good support from local panchayat, regular training and ROTP are conducted very often, there is screening and awareness about lymphatic filariasis and grass root workers are doing survey on vector borne diseases and lastly mass drug administration (MDA) strategy was used”.

Bangalore urban

The faculty of PHC and other related health workers replied that have “got good and competent staff and grass root level health workers for implementing NVBDCP. The negative part is lack of support from local panchayat and no political support and week community participation. We conduct health education and awareness programm in school, colleges, community, jatras etc, grass root level workers were going to field and house to house survey”.

Table 5: Human resources, vacant post and untrained person in the districts.

District	Medical officers		Jr. lab technician		Sr. health assistant (M)		Jr. health assistant (M) (MPWs)		ASHA volunteers	
	% of vacant posts	% of posts untrained	% of vacant posts	% of posts untrained	% of vacant posts	% of posts untrained	% of vacant posts	% of posts untrained	% of vacant posts	% of posts untrained
Bangalore U	14.9	86.8	5.7	50	54.5	100	22.1	0	13.7	33.2
Bangalore R	16.1	100.0	11.1	0	28.0	50	63.9	25.6	22.8	32.6
Belgaum	27.7	3.3	13.0	0	42.9	0	59.5	46.5	16.9	39.8
Bagalkot	32.4	45.8	29.6	20	66.7	0	31.7	23.8	17.1	10.9
Bijapura	37.5	52.9	26.9	0	8.3	31.8	32.1	0.0	17.4	10.0
Bellary	39.6	57.4	17.0	0	83.3	42.9	14.7	28.0	24.5	47.1
Bidar	28.4	91.7	3.7	13.5	7.4	0.0	19.2	0.0	8.1	0.0
Chitradurga	29.9	29.3	4.3	0.0	51.4	50.0	23.7	4.8	12.6	10.6
C'maglur	34.6	62.0	20.3	0.0	82.0	0.0	43.9	0.0	19.2	0.0
Ch'nagar	18.1	100.0	23.7	44.4	62.2	0.0	61.2	0.0	16.7	46.2
Davanagere	37.8	88.9	5.0	34.2	42.1	100.0	7.2	25.0	1.1	0.0
Dharwad	18.0	100.0	32.5	7.4	46.9	100.0	42.0	0.0	11.3	83.7
D Kannada	35.9	83.9	27.5	39.7	59.4	61.5	71.5	0.0	29.3	0.0
Gulbarga	45.1	100.0	1.1	100.0	16.7	100.0	26.0	100.0	0.0	60.6
Yadgir	36.0	21.9	19.2	28.6	33.3	31.8	4.6	12.5	22.7	70.6
Gadag	66.1	73.0	35.4	38.7	44.4	86.7	30.3	70.6	5.0	0.0
Hassan	38.6	37.1	12.4	0.0	61.5	0.0	61.1	0.0	13.1	69.3
Haveri	48.2	83.0	24.6	41.9	48.6	0.0	46.3	0.0	18.3	0.0
Kolar	12.9	63.1	14.0	0.0	82.4	0.0	41.7	0.0	30.5	0.0
Koppal	48.9	16.7	33.3	28.6	55.6	100.0	50.6	24.1	46.5	0.0
Kodagu	64.9	85.2	29.7	0.0	100.0	NA	69.0	0.0	23.4	44.6
Mysore	24.8	86.1	10.6	75.2	82.1	58.3	40.8	29.1	21.0	77.5
Mandya	25.0	82.5	12.1	68.8	55.1	90.9	36.9	22.2	19.2	0.4
Raichur	43.3	0.0	25.5	39.0	57.1	0.0	52.3	12.7	18.1	54.0
Shimoga	66.7	100.0	24.4	61.5	60.8	25.0	44.3	6.8	13.1	19.4
Tumkur	30.4	66.0	14.3	8.8	57.8	0.0	46.2	17.1	17.9	48.2
U Kannada	20.0	81.3	39.7	0.0	75.0	100.0	59.7	0.0	14.2	75.0
Udupi	14.1	0.0	9.1	0.0	50.9	38.5	56.0	0.0	33.1	0.0
Chikkaballapur	9.1	16.7	27.1	5.7	74.3	0	70.4	0.0	28.0	8.6
Ramanagar	23.4	0.0	17.3	0	60.0	100	35.2	0.0	38.5	0.0

DISCUSSION

From the analysis of quantitative data the present study showed that Dakshina Kannada has 5766 cases of malaria in April 2016 to March 2017 with 115.69% prevalence rate and zero CFR likewise Bangalore Rural has 13 cases, 0.12% prevalence and zero CFR. This can

be attributed to systemic surveillance activity both active and passive by ANM and other filed staff.

The analysis of the study revealed that Dakshina Kannada has 474 cases of dengue with 95.10% of prevalence rate and 0.84% of CFR likewise Bangalore rural has got 11 cases, 1.04% prevalence and zero CFR.

For chikungunya, Dakshina Kannada had 1 case with 0.20% of prevalence rate and zero CFR. Bangalore rural stands with 10 cases, 0.95% prevalence rate and zero CFR.

For JE and AES cases Dakshina Kannada stands 5 and 98 cases respectively with 1% prevalence rate for JE and zero CFR for JE. This can be because of attitude and practices of the community. Community participation is yet to be achieved to a desired degree. The human resources are seen vacant at many places also the geographical and climate do influence.

In Bidar district 3264 lymphatic filariasis cases were found and in Yadgiri 2101 cases have been detected likewise in Bijapur and Bagalkote district 365 and 644 respectively.

From the analysis of qualitative data we came to know that the following are the factors associated with successes or fall of the national program. Failure factors are related to the Geographical and weather condition of the Dakshina Kannada in which the vector borne diseases hail much during winter and monsoon seasons. Other factors includes are lack of human resource and competent worker force, lesser community participation and poor support of local panchayats in some areas of Karnataka. These findings are supported by the conclusions made by Prasad et al in his study in three selected districts of Assam, India.⁵ His findings revealed that malaria control programme had been jeopardized seriously due to improper implementation of vector control measures, lack of adequate professional support and varied commitment on the part of the State Government. He concluded that long-term malaria control strategy can be made by increasing awareness in the local communities about its incidence, prevalence and control. The observation also necessitates further in-depth evaluation with appropriate regular active surveillance round the year with prompt detection and treatment facilities in order to control malaria effectively in these districts.

In some areas of the state (Bangalore rural and Bidar) the NVBDCP was running successful with good outcome due inter-sectoral co-ordination for achieving targeted health goals, NGOs inter-sectoral co-ordination and support, effective training to the health care professionals, implementing the programme with innovative ideas, Good reporting system and effective leadership of human resource personnels. These statements are in accordance with the observations of Srivastava et al.⁶ He noted that vector control strategies implementing under NVBDCP were proved to be a successful tools in interrupting disease transmission with high coverage area in India.

Recommendations

- All the vacant posts must be filled on permanent basis or contract wherever they are required.

- Employing enough number of public health personnel in required areas will improve the outcome of the programme.
- Utilization of services of AYUSH is highly beneficial. If we utilized AYUSH physician in various activities like IEC, research etc. so that we can achieve UHC and ease the burden of diseases.
- Training from resourceful person will be benefits.
- Capacity building and strong leadership will be of most important.
- Strong IEC is necessary to create awareness and to bring community participation.

CONCLUSION

With these observations, it can be concluded that among all other states Dakshina Kannada has got highest number of cases, greater proposition and high prevalence rate of vector borne diseases. This was mainly due to rigid attitude of the community, geographical factors, and insufficient human resources. The problem can be solved by employing adequate human resources, by increasing awareness in the community by conducting health camps, jattras and by creating responsiveness in the young generation by conducting competitions in the relevant areas in schools and colleges. Active participation of local panchayats, health workers and NGO's should be made compulsory.

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